FORM PTO-1449 (modified)
To: U.S. Department of Commerce
(FORM PAT-1449)
Patent and Trademark Office

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

Atty. Dkt. No.	M#	Client Ref.
	273686	F00-219-US-DIV-3

Applicant: MANABE et al.

Appln. No.: 09/677,781

Filing Date: October 2, 2000

Examiner: S. MULPURI | Group Art Unit: 2812

Date: May 20, 2002 Page 1 of 1

U.S. PATENT DOCUMENTS

Examiner's Initials*		Document Number	Date MM/YYYY	Name (Family Name of First Inventor)	Class	Sub Class	Filing Date (If appropriate)
	AR						
	BR						
	CR						
	DR						
	ER						

FOREIGN PATENT DOCUMENTS

		Document Number	Date MM/YYYY	Country	Inventor Name		English Abstract		Translation Readily Available	
							Enclosed	No	Enclose	No
SM	FR	58-200527	11/1983	Japan			X			
SM	GR	60-175468	09/1985	Japan			X			
SM	HR	63-188938	08/1988	Japan			X			
SM	IR	02-042770	02/1990	Japan			X			
	JR									
	KR									
	LR									
	MR									

OTHER (Including in this order Author, Title, Periodical Name, Date, Pertinent Pages, etc.)

SM	NR	AZOULAY, R. et al., "Mocvd N-Type Doping of GaAs and GaA1As Using Silicon and Selenium and Fabrication of Double Heterostructure Bipolar Transistor," *Journal of Crystal Growth*, Vol. 68, 1984, pp. 453-460.
	QR	BASS, S., "Silicon and Germanium Doping of Epitaxial Gallium Arsenide Grown By The Trimethylgallium- Arsine Method," *Journal of Crystal Growth*, Vol. 47, 1979, pp. 613-618.
	PR	HIRAMATSU, K., "Effects of Buffer Layer in Movpe Growth of GaN Film on Sapphire Substrate," *Nagoya University*, 1988, pp. 334-342. DUPLICATE
	QR	KHAN M., "Effect of Si on Photoluminescence of GaN," *Solid State Communications*, Vol. 57, No. 6, 1986, pp. 405-409.
	RR	SZE, S., "Physics of Semiconductor Devices," *Wiley-Interscience*, 1969, pp. 42-43.
SM	SR	TIETJEN, J., "Vapor Phase Growth Technique and System for Several III-V Compound Semiconductors," *RCA Laboratories*, 1969, pp. 1-9. DUPLICATE
	TR	
	UR	
	VR	
	WR	

Examiner S. Mulpuri Date Considered: 09/29/06

*EXAMINER: Initial if citation considered, whether or not citation is in conformance with MPEP § 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to Applicant.

FORM PTO-1449 (modified)
To: U.S. Department of Commerce
(PW FORM PAT-1449)
Patent and Trademark Office

Atty. Dkt. No.	M#	Client Ref.
	273686	F00-219-USdiv3

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

Applicant: MANABE et al.

Appln. No.: 09/677,781

Filing Date: October 2, 2000

Date: November 28, 2001 Page 1 of 1

Examiner: S. Mulpuri Group Art Unit: 2812

U.S. PATENT DOCUMENTS

Examiner's Initials*		Document Number	Date MM/YYYY	Name (Family Name of First Inventor)	Class	Sub Class	Filing Date (if appropriate)
	AR						
	BR						
	CR						
	DR						
	ER						
	FR						
	GR						
	HR						
	IR						
	JR						

FOREIGN PATENT DOCUMENTS

		Document Number	Date MM/YYYY	Country	Inventor Name		English Abstract		Translation Readily Available	
							Enclosed	No	Enclose	No
	KR	59-228776	12/1984	Japan	Maefutsu et al.			X	FULL	
	LR	56-080183	07/1981	Japan	Kobayashi et al.		X			X
	MR									
	NR									
	OR									
	PR									
	QR									
	RR									

OTHER (Including in this order Author, Title, Periodical Name, Date, Pertinent Pages, etc.)

	SR	Amano, *The Research on MOVPE Growth and Application to Photoelectric Physical Property of GaN and a Device Emitting Blue-Color Lights*, Doctoral Dissertation of Nagoya University, Chapter 7,8 (pages 80-94), January 13, 1989		X	Partial
	TR	Jacob et al., *Efficient Injection Mechanism for Electroluminescence in GaN*, Applied Physics Letter, Vol. 30, No. 8, pp. 412-414, April 15, 1977			
	UR	Tietjen et al., *Vapor Phase Growth Technique and System for Several III-V Compound Semiconductors*, RCA Laboratories, 5 pages, March 1969		X	Partial
	VR	Ta, *Photoluminescence Characterization of Shallow Impurities in GaN Grown by Chemical Vapor Deposition*, Dissertation for University of Southern California, pages 1-166, July 1981			
	WR	Wang, *Photoluminescence and Stimulated Emission from GaN*, Dissertation for University of Southern California, pages 1-158, November 1978			
	XR	Sayyah, *A Study of Growth Mechanisms and Electrical and Optical Properties of Epitaxial $Al_xGa_{1-x}N$ layers Grown by Atmospheric Pressure Metalorganic Chemical Vapor Deposition*, Dissertation for University of Southern California, pp. 1-176, February 1986			

Examiner [signature] Date Considered: 12/9/03

*EXAMINER: Initial if citation considered, whether or not citation is in conformance with MPEP § 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to Applicant.

To: U.S. Department of Commerce
(PM&S FORM PAT-1449)
. Patent and Trademark Office

Atty. Dkt. No.	Ser. No.	Client/Ref.
	273686	F00-219-US-DIV-3

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

Applicant: **MANABE et al.** #3 IDS 3-2-01 R Stoke

Div. of Appln. No.: 09/417,778

Filing Date: October 14, 1999

Examiner: Minh Loan Tran | Group Art Unit: 2811

Date: OCTOBER 2, 2000 Page 1 of 5

U.S. PATENT DOCUMENTS

Examiner's Initials*		Document Number	Date MM/YYYY	Name (Family Name of First Inventor)	Class	Sub Class	Filing Date (If appropriate)
SM	AR	5,278,433	1/1994	Manabe et al.			
	BR	4,844,989	07/89	Murdock			
	CR	4,408,217	10/83	Kobayashi			
	DR	4,268,842	05/81	Jacob et al.			
	ER	5,005,057	04/91	Izumiya et al.			
	FR	4,614,961	09/86	Khan et al.			
	GR	4,153,905	05/79	Charmakedze et al.			
	HR	4,855,249	08/89	Akasaki et al.			
	IR	4,911,102	03/90	Manabe et al.			
	JR	4,945,548	08/90	Kotaki et al.			
	KR	4,396,929	08/83	Ohki et al.			
	LR	5,006,908	04/91	Natsuoka et al.			
	MR	4,608,581	08/86	Bagratishvili et al.			
SM	NR	4,473,938	10/84	Kobayashi et al.			

FOREIGN PATENT DOCUMENTS

		Document Number	Date MM/YYYY	Country	Inventor Name	Class	SubClass	English Abstract		Translation Readily Available	
								Enclosed	No	Enclose	No
SM	OR	2-229475	09/1990	Japan					X		X
	PR	2-275682	11/1990	Japan					X		X
	QR	5-042785	04/1975	Japan					X		X
	RR	59-228776	12/1994	Japan					X		X
	SR	0 620 203 A1	10/1994	Europe	Nakahata				X		X
	TR	0-277597	08/1988	EPA					X		X
	UR	03-034549	02/1991	Japan	Toyoda				X		X
	VR	34549	02/1991	Japan	Hatano				X		X
	WR	4,006,449	09/1990	Germany	Manabe				X		X
SM	XR	57-018377	01/1982	Japan	KOBAYASHI				X		X

OTHER (Including in this order Author, Title, Periodical Name, Date, Pertinent Pages, etc.)

SM	YR	English Abstract of OKI Japanese Application Published 9/22/82 under No. 57-153479.
	ZR	I. Akasaki et al., "Effects of AlN Buffer Layer on Crystallographic Structure... by MOVPE", J. Crystal Growth 98 (1989) pp. 209-19.
	AAR	Liu et al., "Growth morphology and surface-acoustic-wave measurements of AlN films on Sapphire," Journal of Applied Physics, Vol. 46, No. 9, September 1975, pages 3703-3706.
SM	BBR	Ilegems et al. "Electrical properties of n-Type Vapor-growth Gallium Nitride", J. Phys. Chem. s lids., 1973, Vol. 34, pp. 885-895.

Examiner S. Mulpuru Date Considered: 6/26/01

EXAMINER: Initial if citation considered, whether or not citation is in conformance with MPEP § 609. Draw line through citation if not conformance and not considered. Include copy of this form with next communication to Applicant.

To: U.S. Department of Commerce
(PM&S FORM PAT-1449)
Patent and Trademark Office

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

Atty. Dkt. No.	[redacted]	[redacted]
	273686	F00-219-US-DIV-3

Applicant: MANABE et al.

Div. of Appln. No.: 09/417,778

Filing Date: October 14, 1999

Examiner: Minh Loan Tran | Group Art Unit: 2811

Date: October 2, 2000 Page 2 of 5

U.S. PATENT DOCUMENTS

Examiner's Initials*		Document Number	Date MM/YYYY	Name (Family Name of First Inventor)	Class	Sub Class	Filing Date (if appropriate)
	AR	5,218,216	06/1993	Manabe			
	BR	5,247,533	09/1993	Okazaki et al.			
	CR	5,205,905	04/1993	Kotaki et al.			
	DR	5,079,184	01/1992	Hatano et al.			
	ER	5,076,860	12/1991	Ohba et al.			
	FR						
	GR						
	HR						
	IR						
	JR						
	KR						
	LR						

FOREIGN PATENT DOCUMENTS

		Document Number	Date MM/YYYY	Country	Inventor Name	Class	SubClass	English Abstract		Translation Readily Available	
								Enclosed	No	Enclose	No
	MR	58-012381	01/1983	Japan	Yoneda				X		X
	NR	61-007671	01/1986	Japan	Kawabata				X		X
	OR	57-087184	05/1982	Japan	Tabuchi				X		X
	PR	57-153479	09/1982	Japan	Ooki				X		X
	QR	2-738329	03/1978	Germany	Jacob et al.				X		X
	RR	56-59699	05/1981	Japan	Ooki				X		X
	SR	34549	02/1991	Japan	Hatano				X		X
	TR	3-046018	09/1981	Germany	Kobayashi et al.				X		X

OTHER (Including In this order Author, Title, Periodical Name, Date, Pertinent Pages, etc.)

	UR	Koide et al. "Effect of an A1N Buffer layer on AlGaNa-A1203 Heteroepitaxial Growth by MOVPE", Japanese Journal of Crystal Growth 1986, Vol. 13, No. 4, pp. 218-225.
	VR	Sayyah et al. "The Influence of TMA and SiH4 on the Incorporation Rate of GaINAlxGa1-xN Crystals Grown from TMG and NH3", Journal of Crystal Growth 77 (1986), pp. 424-429 North-Holland, Amsterdam.
	WR	Bottka, et al., Silicon and beryllium doping of OMVPE Grown..., Journal of Crystal Growth 68 (1984) pp. 54-59, North-Holland Amsterdam
	XR	Madar et al., "Growth Anisotrophy in the CaN/Al203 System," Journal of Crystal Growth 40, 1997, pages 239-252.
	YR	Koide et al., "Epitaxial Growth and Properties of $Al_xGa_{1-x}N$ by MOVPE, R printed from Journal of the Electrochemical Society, Vol. 133, No. 9, September 1996, pp. 1956-1960
	ZR	Boulou et al., "Light emitting Di des Based on GaN", Philips Tech. Rev., 37, 237-240 No. 9/10, 1977.

Examiner S. Mullan Date Considered: 6/26/06

EXAMINER: Initial if citation considered, whether r not citation is in conformance with MPEP § 609. Draw line through citation if not conformance and not considered. Include copy of this form with next communication to Applicant.

To: U.S. Department of Commerce
(PM&S FORM PAT-1449)
Patent and Trademark Office

Atty. Dkt. No.	M#	Client Ref.
	273686	F00-219-US-DIV-3

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

Applicant: MANABE et al.

Div of Appln. No.: 09/417,778

Filing Date: October 14, 1999

Date: October 2, 2000 Page 3 of 5

Examiner: Minh LoanTran | Group Art Unit: 2811

U.S. PATENT DOCUMENTS

Examiner's Initials*		Document Number	Date MM/YYYY	Name (Family Name of First Inventor)	Class	Sub Class	Filing Date (if appropriate)
	AR						
	BR						
	CR						
	DR						
	ER						
	FR						
	GR						
	HR						
	IR						
	JR						
	KR						
	LR						

FOREIGN PATENT DOCUMENTS

		Document Number	Date MM/YYYY	Country	Inventor Name	Class	SubClass	English Abstract		Translation Readily Available	
								Enclosed	No	Enclose	No
SM	MR	49-29771	7/1972	Japan	Kasano				x		x
	NR	2623466	2/1990	Japan	Sassa et al.				x		x
	OR	59-228776	6/1983	Japan	Maefutsu et al.				x		x
	PR	60-173829	2/1984	Japan	Maefutsu et al.				x		x
	QR	1-589351	05/1981	England							
	RR	63-188977	08/1988	Japan							
	SR	62-119196	05/1987	Japan							
	TR	57-046669	10/1982	Japan							
	UR	03-034549	02/1991	Japan							
SM	VR	54-071589	06/1979	Japan	Toyoda						

OTHER (Including in this order Author, Title, Periodical Name, Date, Pertinent Pages, etc.)

SM	WR	English Abstract of OOKI Japanese Application Published 9/19/82 under No. 57-153479.
	XR	I. Akusuki et al., "Effects of AlN Buffer Layer on Crystallographic Structure... by MOVPE", J. Crystal Growth 98 (1989) pp. 209-19.
	YR	Sayyah, A Study of Growth Mechanisms and Electrical and Optical Properties of Epitaxial Al_xGa_xN Layers Grown by Atmospheric Pressure Metalorganic Chemical Vapor Deposition, A Dissertation presented to Faculty of the Graduate School, University of Southern California, February 1986, pp. 125-136.
SM	ZR	Koide et al., Epitaxial Growth and Properties of $Al_xGa_{1-x}N$ by MOVPE, J. Electrochem. Soc.: SOLID-STATE SCIENCE AND TECHNOLOGY, Vol. 133, No. 9, September 1986, pp. 1956-1960.

Examiner S. Meehan Date Considered: 6/26/01

EXAMINER: Initial if citation considered, whether or not citation is in conformance with MPEP § 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to Applicant.

To: U.S. Department of Commerce
(PM&S FORM PAT-1449)
Patent and Trademark Office

Atty. Dkt. No.	[redacted]	[redacted]
	273686	F00-219-US-DIV-3

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

Applicant: MANABE et al.

Div. of Appln. No.: 09/417,778

Filing Date: October 14, 1999

Examiner: Minh LoanTran | Group Art Unit: 2811

Date: October 2, 2000 Page 4 of 5

U.S. PATENT DOCUMENTS

Examiner's Initials*		Document Number	Date MM/YYYY	Name (Family Name of First Inventor)	Class	Sub Class	Filing Date (If appropriate)
	AR						
	BR						
	CR						
	DR						
	ER						
	FR						
	GR						
	HR						
	IR						
	JR						
	KR						
	LR						

FOREIGN PATENT DOCUMENTS

		Document Number	Date MM/YYYY	Country	Inventor Name	Class	SubClass	English Abstract		Translation Readily Available	
								Enclosed	No	Enclose	No
SM	MR	58-046686	03/1983	Japan	Yoneda				X		X
	NR	54-071590	06/1979	Japan	Toyoda				X		X
	OR	02-081482	03/1990	Japan	Manabe				X		X
	PR	02-081483	03/1990	Japan	Manabe				X		X
	QR	02-081484	03/1990	Japan	Manabe				X		X
SM	RR										

OTHER (Including in this order Author, Title, Periodical Name, Date, Pertinent Pages, etc.)

SM	SR	Masakiyo Matsumura, Semiconductor Devices, Chapter 2, Principle of Diodes, 2.1: pn junction and rectification, December 25, 1986, p. 13.
	TR	Kiyoshi Takahashi, Semiconductor Engineering: Basic Characteristics of Semiconductor, Morikita Electric Engineering Series, Vol. 4, Chapter 14: Semiconductor Material Technics, 14:1: Forming of Semiconductor Material, August 1, 1975, p. 297.
	UR	Hiroyuki Matsunami, Semiconductor Engineering, Chapter 2: Basic Characteristics of Semiconductor, March 25, 1983, pp. 18-31.
	VR	Sano et al., Properties of III-V Nitride Semiconductors, Japanese Journal of Applied Physics, Vol. 52, No. 5, 1983, pp. 374-387.
	WR	Miyoshi Haradome, Basics of Semiconductor Engineering, Chapter 8: Compound Semiconductor, 8:1, Conditions to be Semiconductor, August 30, 1967, p. 161.
SM	XR	A.S. Grove, Physics and Technology of Semiconductor, Chapter 4: Basics of Semiconductor Physics, 1967, translated and published in Japan June 23, 1995, pp. 112-123.

Examiner [signature] Date Considered: 6/26/01

EXAMINER: Initial if citation considered, whether or not citation is in conformance with MPEP § 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to Applicant.

To: U.S. Department of Commerce
(PM&S FORM PAT-1449)
Patent and Trademark Office

Atty. Dkt No.	[redacted]	Client Ref.
	273686	F00-219-US-DIV-3

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

Applicant: MANABE et al.

Div of Appln. No.: 09/417,778

Filing Date: October 14, 1999

Date: OCTOBER 2, 2000 Page 5 of 5

Examiner: Minh LoanTran Group Art Unit: 2811

U.S. PATENT DOCUMENTS

Examiner's Initials*		Document Number	Date MM/YYYY	Name (Family Name of First Inventor)	Class	Sub Class	Filing Date (if appropriate)
	AR						
	BR						
	CR						
	DR						
	ER						
	FR						
	GR						
	HR						
	IR						
	JR						

FOREIGN PATENT DOCUMENTS

		Document Number	Date MM/YYYY	Country	Inventor Name	Class	SubClass	English Abstract		Translation Readily Available	
								Enclosed	No	Enclose	No
	KR										
	LR										
	MR										
	NR										
	OR										
	PR										

OTHER (Including in this order Author, Title, Periodical Name, Date, Pertinent Pages, etc.)

SM	UR	Kazuyo Kadota, The Invention, 39 New Technics Selected by Japan Patent Office; Laser Technics, Vol. 94, No. 9 (the first volume); September 1997, pp. 42-49.
	VR	Pankove et al., Optical Absorption of GaN, Applied Physics Letters, Vol. 17, No. 5, September 1970, pp. 197-198.
	WR	Amano et al., Effects of the Buffer Layer in Metalorganic Vapour Phase Epitaxy of GaN on Sapphire Substrate, Thin Solid Films, 163, (1988), pp. 415-420.
	XR	Akasaki et al., Effects of AlN Buffer Layer on Crystallographic Structure and on Electrical and Optical Properties of GaN and $Ga_{1-x}Al_xN(0 < x < 0.4)$ Films Grown on Sapphire Substrate by MOVPE, Journal of Crystal Grown 98 (1989), pp. 209-219.
	YR	Bottka et al., Silicon and Beryllium Doping of OMVPE Grown $Al_xGa_{1-x}As$ (x = 0-0.3) Using Silane and Diethylberyllium, Journal of Crystal Growth 68 (1984) pp. 54-59.
	AAR	Hiramatsu et al. "Effects of Buffer Layer in MOVPE Growth of GaN Film on Sapphire Substrate" Japanese Journal of Crystal Growth, 1998, Vol. 15, No. 3&4, pp. 334-342
SM	BBR	Elwell et al. "Crystal Growth of Gallium Nitride" Prog. Crystal Growth and Charact. 1988, vol. 17, pp. 53-78.
	CCR	
	DDR	
	EER	

Examiner [signature] Date Considered: 6/21/04

EXAMINER: Initial if citation considered, whether or not citation is in conformance with MPEP § 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to Applicant.